MARKING CASSIDINAE (COLEOPTERA: CRYSOMELIDAE) LARVAE IN THE FIELD FOR POPULATION DYNAMICS STUDIES[1]

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ABSTRACT: Marks on the exuviae held by caudal fork, a permanent structure in Cassidinae larvae, can provide a simple method for the study of larval population dynamics in this group.

Population-dynamics studies of insects are usually restricted to adults, which can be easily individualized by some kind of mark. Many mortality factors act on juvenile stages, however, and need to be studied. Since any mark directly placed on larvae or nymphs can only be seen until ecdysis occurs to the following instar, various indirect methods have been described to study the population-dynamics of the immature insects. Approximate correlation or indices of equivalence with population sizes at different times during insect development can be obtained by measures of damage, counts of exuviae or collecting feces of the immature insects (see Southwood 1978). These indirect methods can supply good correlations for some species. Another method developed by Kiritani and Nakasuji (1967) improved estimates of staged specific mortality rates for a population developing through various life stages. A drawback of this method is the fixed sampling pattern that modifies the population size and makes it difficult to obtain good estimates.

Cassidinae larvae offer a special opportunity for studies on population dynamics of juvenile insects. One of their characteristics is the accumulation of the exuviae and some feces attached to the caudal fork, constituting a permanent structure called the annex by Buzzi (1988). This structure can be present even on pupae and is suitable for marking.

The mobility of the caudal fork permits the annex to be adjusted over the insect's body, giving a camouflaged aspect. The side of the annex that is in contact with the larva's body is smooth and it is possible to count the series of exuviae on it. Marks can be placed on this side of the annex, without any modification of the larval aspect, giving little or no effect on the probability of attack by natural enemies or survival of the young insects in the field.

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A population of *Charidotis punctatostriata* larvae was marked in Campinas, São Paulo, Brazil, in a fallow field where the host plant *Pyrostegia venusta* (Bignoniaceae) was abundant.

Marks were made using white nail polish, but a special marking pen could just as well have been used, with each larva receiving its own number.

Larvae of *C. punctatostriata* from the same egg mass show a tendency to remain together. This made it easy to mark groups of different instars, placing the white spot over the more recent exuviae attached to the annex. The small white spot could only be seen when the larva spontaneously raised the annex or when this movement was provoked touching it with a brush.

The five instars of *C. punctatostriata* larvae found in the fallow field were observed and counted daily until they moulted to the next instar, when they were collected and reared further in the laboratory, while the observations continued.

None of the marks was lost in a month of observations. During this time all the marked larvae completed their development in the laboratory, disappeared by predation in the field, were mummified by parasitoids or died by disease (table 1). These data will be analysed and discussed in a separate paper about the field biology of *C. punctatostriata*.

Table 1. Survival of *Charidotis punctatostriata* (Coleoptera: Chrysomelidae: Cassidinae) larvae marked in the field. (number of individuals)

IN THE FIELD		LATER IN LABORATORY			
Instar marked	Number marked	Surviving to next instar	Mumified by parasites	Died by diseases	Surviving to adults
1	60	14	0	8	6
2	50	12	2	4	6
3	50	38	8	5	25
4	51	34	23	2	9
5	51	34	9	2	23

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